CLAIMS

What is claimed is:

1. A composition comprising an aqueous dispersion of an electrically conductive organic polymer doped with a polymeric acid and a plurality of nanoparticles.

2. A composition according to Claim 1, wherein said electrically conductive organic polymer is selected from polyanilines, polythiophenes polypyrroles, and combinations thereof.

3. A composition according to Claim 1, wherein the pH is adjusted to between 1 and 8.

4. A composition according to Claim 1, wherein said nanoparticles are inorganic nanoparticles.

5. A composition according to Claim 4, wherein said inorganic nanoparticles are selected from silica, alumina, semiconductive inorganic oxide particles, insulating inorganic oxide particles, piezoelectric oxide nano-particles, pyroelectric oxide nano-particles, ferroelectric oxide nano-particles, photoconductive oxide nanoparticles, electrically conductive metal oxides, electrically conductive metal nanowires, and electrically conductive metal nanoparticles.,

6. A composition according to Claim 1, wherein said nanoparticles are organic nanoparticles.

7. A composition according to Claim 6, wherein said organic nanoparticles are selected from colloid-forming polymeric acids, carbon nanotubes, carbon nano-particles, graphitized carbon nano-particles, graphitized carbon nano-fibers, piezoelectric polymers, pyroelectric polymers, ferroelectric polymers, and photoconductive polymers.

8. A composition according to Claim 7, wherein said colloid-forming polymeric acid is a perfluoroethylene sulfonic acid.

9. A composition according to Claim 1, wherein said nanoparticles have a particle size less than about 500 nm.

10. A composition according to Claim 1, wherein said nanoparticles have a particle size less than about 250 nm.

11. A composition according to Claim 1, wherein said nanoparticles have a particle size less than about 50 nm.

12. A composition according to Claim 5, wherein the weight ratio of silica:electrically conductive polymer is about 4:1.

13. A composition according to Claim 5, wherein the nanoparticle is an electrically semiconductive oxide, and a weight ratio of electrically semiconductive oxide to electrically conductive polymer is about 1.5 to1.

14. A buffer layer comprising an electrically conductive polymer and a plurality of nanoparticles.

15. A buffer layer according to Claim 14, wherein said electrically conductive polymer is selected from polyanilines, polythiophenes, polypyrroles, and combinations thereof.

16. A buffer layer according to Claim 15, wherein said electrically conductive polymer is selected from PAni/PAAMPSA, PAni/PSSA, PEDT/PSSA, PEDT/PAAMPSA, PPy/PSSA, and PPy/PAAMPSA.

17. A buffer layer according to Claim 14, wherein said nanoparticles are inorganic nanoparticles.

18. A buffer layer according to Claim 14, wherein said inorganic nanoparticles are selected from silica, alumina, and electrically semiconductive metal oxides.

19. A buffer layer according to Claim 14, wherein said nanoparticles are organic nanoparticles.

20. A buffer layer according to Claim 14, wherein said organic nanoparticles are selected from colloid-forming polymeric sulfonic acids, colloid-forming polymeric acrylatic acids, colloid-forming polymeric phosphonics acids, and colloid-forming polymeric phosphoric acids..

21. A buffer layer according to claim 14 wherein said organic nano-particles comprise perfluoroethylenesulfonic acid.

22. A buffer layer made from an aqueous dispersion comprising poly(3,4-thylenedioxythiophene) and polymeric perfluroethylenesulfonic acid, wherein the aqueous dispersion has a pH greater than 2 and an equivalent ratio of polymeric perfluroethylenesulfonic acid to poly(3,4-thylenedioxythiophene) greater than 0.1.

23. A buffer layer according to Claim 14, wherein said layer has a conductivity of less than about 1×10^{-3} S/cm.

24. A buffer layer according to Claim 14, wherein said layer has a conductivity of less than about 1×10^{-5} S/cm.

25. An organic electronic device comprising a buffer layer comprising an electrically conductive polymer and a plurality of nanoparticles.

26. A device according to Claim 25, wherein said electrically conductive polymer is selected from polyanilines, polythiophenes, polypyrroles, and combinations thereof.

27. A device according to Claim 26, wherein said electrically conductive polymer is selected from PAni/PAAMPSA, PAni/PSSA, PEDT/PAAMPSA, PEDT/PSS, PPy/PSSA, and PPy/PAAMPSA.

28. A device according to Claim 25, wherein said nanoparticles are inorganic nanoparticles.

29. A device according to Claim 25, wherein said inorganic nanoparticles are selected from silica, alumina, or electrically semiconductive metal oxides.

30. Adevice according to Claim 25, wherein said nanoparticles are organic nanoparticles.

31. A device according to Claim 25, wherein said organic nanoparticles are selected from colloid-forming polymeric acids.

32. A device according to Claim 25, wherein said buffer layer has a conductivity less than about 1×10^{-3} S/cm.

33. A thin film field effect transistor electrode, comprising an electrically conductive polymer and a plurality of nanoparticles.

34. A thin film field effect transistor electrode according to Claim 33, wherein said electrically conductive polymer is selected from polyanilines, polythiophenes, polypyrroles, and combinations thereof.

35. A thin film field effect transistor electrode according to Claim 33, wherein said nanoparticles are inorganic nanoparticles.

36. A thin film field effect transistor electrode according to Claim 33, wherein said inorganic particles are metallic nanoparticles.

37. A thin film field effect transistor electrode according to Claim 33, wherein said metallic nanoparticles are molybdenum nanoparticles.

38. A thin film field effect transistor electrode according to Claim 33, wherein said nanoparticles are organic nanoparticles.

39. A thin film field effect transistor electrode according to Claim 33, wherein said organic nanoparticles are selected from carbon nanotubes, graphitized carbon particles, and graphitized carbon nano-fibers.

40. A thin film field effect transistor comprising an electrode according to Claim 33.

41. A thin film field effect transistor according to Claim 40, wherein said thin film field effect transistor has a conductivity greater than about 10 S/cm.

42. A method for reducing conductivity of an electrically conductive organic polymer film deposited from an aqueous dispersion onto a substrate to a value less than about 1 x 10^{-3} S/cm, comprising adding a plurality of nanoparticles to said aqueous solution.

43. An electronic device according to Claim 25, wherein the device is selected from photoconductive cells, photoresistors, photoswitches, phototransistors, phototubes, IR detectors, photovoltaic device, solar cells coating materials for memory storage devices, field effect resistance devices, anti-static films, biosensors, electrochromic devices, solid electrolyte capacitors, energy storage devices, and electromagnetic shielding.